PRIMERA HEALTHCARE TECHNICAL DOCUMENT

LIS Integration using Signature Slide Printer Windows Printer Driver

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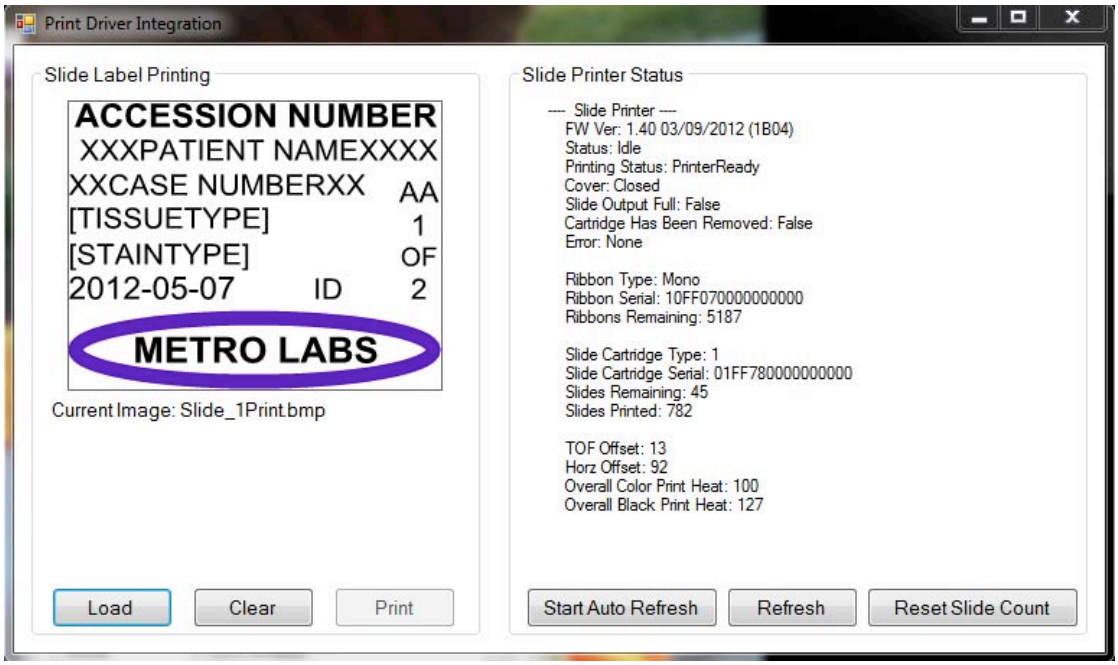
INTRODUCTION

This document will focus on connecting the printer to your LIS via the Signature Slide Printer Windows Printer Driver. To see other ways to integrate the Signature printer into your LIS download Primera's Slide Printer Integration white paper at http://primera-healthcare.eu/en/LISIntegration.html

LIS Integration using Signature Slide Printer Windows Printer Driver

- LIS software can use the slide printer as a standard Windows raster-based printer by utilizing the included Windows XP/Vista/7 printer driver. This printer driver is included at no extra charge with every Signature Slide Printer.
- Slide images generated by the LIS are sent via standard Windows APIs to the printer.
- Primera provides a sample application with completed source code, which can be downloaded at http://primera-healthcare.eu/en/LISIntegration.html. The sample application (shown below) will show developers how to interface with the slide printer through the printer driver.



SENDING A SLIDE LABEL TO THE PRINTER

Description:

The windows print driver is a raster based print driver. LIS systems that already print to raster based print drivers can print to the Signature Slide Printer. There may be a few changes required to the current template in order for the printing to work. Below is a list of requirement to print via the printer driver.

Printing Requirements:

- Colors supported: red, green, blue, cyan, magenta, yellow, black, white (orange, violet and grey will also be supported soon)
- Printable area: .87" x .67" (22mm x 17mm)
- DPI: the rasterized DPI of the image should be 300 dpi; any higher resolution is not required and will only result in longer raster times.
- With the size and DPI detailed above the bmp size should be 260x200 pixels.

Sample Code

Primera has provided a sample utility and source code for how to print a .bmp file to the printer via standard Windows printing calls. This code can be found in the SlidePrinter class (SlidePrinter.cs) in the sample application. The code is in C# but the principles should apply to any programming language.

OTHER COMMUNICATION

Description:

The Signature Slide Printer will provide status and configuration values via the printer driver. An application can query this information using standard windows API calls. Primera has provided a sample application with complete source code that details how to query the printer for status information.

Communication Details:

- Current printer status such as error conditions, cover status, and firmware versions can be queried.
- Detailed supply status including ribbon and slide types and levels can be queried.
- Raw data commands can be sent to the printer.

Complete Status Structure

Primera has provided a sample utility and source code for how to read status from the printer (See the Refresh Method of the SlidePrinter class). The structure of the data returned from the printer is detailed in the table below.

Status Structure		
Byte Offset	Length	Description ('' denotes ASCII Character)
0	1	Start Character (Value is always 0x1b)
1	1	Command Character (Value is always 0x04)
2	1	Number of bytes in message including this byte and checksum
3	1	Message Type (0x01 is a status message)
4	1	Product ID (Value is always 'n')
5	1	Record Number (Will increment with each request)
6	1	Model #
7	1	PGA Version Number
8	16	Firmware Version and Date Code
24	4	Firmware Checksum
28	2	System Error Value (See Table Below for possible values)
30	1	Head Lifter Status (Down = 0x81, Up = 0x80)
31	1	Media Sensor Value
32	1	OEM Number
33	1	Output Status (Full = 0x80, Not Full = 0x00)
34	1	Head Lift Sensor Value
35	20	Setup Values (Internal Use Only)
55	1	Black Print Heat Value
56	1	Color Heat Value
57	1	Preload Mode (On = 0x01, Off = 0x00)
58	1	Slide Type (Invalid = 0xFE, Not Installed = 0xFF, Valid = other)
59	1	Ribbon Type (Invalid = 0xFE, Not Installed = 0xFF, Valid = other)
60	1	Print Speed
61	8	Slide Cartridge Serial Number
69	2	Number of Slides in Slide Cartridge
71	4	Total Number of Slides Printed
75	1	System Busy Flag (Idle ='I', Busy = 'B, Powered Off = 'X'
76	1	Cover Flag (Closed = 'C', Open = 'O')
77	2	Setup Values (Internal Use Only)
79	1	Printing Status (Ready for Print = 0x00, Busy = 0x80)
80	3	USB Serial Number
83	13	Setup Values (Internal Use Only)
96	1	Vertical Offset
97	1	Horizontal Offset
98	1	Black Print Heat Value
99	1	Color Print Heat Value
100	8	Ribbon Serial Number
108	2	Number of Prints Remaining on Ribbon
110	1	Slide Cartridge Removed Flag (Not Removed = 0x00, Removed = not 0x00)
111	16	Unused
127	1	Checksum

System Error Bit Field	
Bit	**Description (More than 1 bit can be set)**
0	Head Lifter Error
1	Invalid Ribbon
2	Ribbon Advance Error
3	Slide Jam Error
4	Out of Slides
5	Head Loading Error
6	Ribbon PWM Error
7	Invalid Slide Cartridge
8	Out of Ribbon
9	Ribbon Break Detected
10	Model Number Error
11	Output is Full
12	Slide Cartridge Contact Error
13	Ribbon Contact Error
14	Ribbon Jam Error

Commands

Primera has provided a sample utility and source code for how to send non printing commands to the printer (See the SetSlideCount Method of the SlidePrinter class for an example). The list of commands that can be sent to the printer and the corresponding command bytes are detailed in the table below.

Raw Commands	
Description	**Command Bytes (K = Checksum of command)**
Reset System	0x1b, 0x04, 0x05,0x00, 0x00, 0x00, 0x00,K
Slide Load and Eject Cycle	0x1b, 0x04, 0x0F, 0x00, 0x00, 0x00, 0x00,K
Restore Factory Defaults	0x1b, 0x04, 0x15, 0x00, 0x00, 0x00, 0x00,K
Set Vertical Offset	0x1b, 0x04, 0x0A, 0x01, 0x00, Value, K
Set Horizontal Offset	0x1b, 0x04, 0x0B, 0x01, 0x00, Value, K
Set Black Print Heat	0x1b, 0x04, 0x0C, 0x01, 0x00, Value, K
Set Color Print Heat	0x1b, 0x04, 0x0D, 0x01, 0x00, Value, K
Set Preload Mode	0x1b, 0x04, 0x13, 0x01, 0x00, Value, K
Firmware Update (Followed by Firmware File)	0x1b, 0x04, 0x07, 0x00, 0x00, 0x00, 0x00,K
Toggle Head Lifter	0x1b, 0x04, 0x0A, 0x00, 0x00, 0x00, 0x00,K
Set Slide Cartridge Type	0x1b, 0x04, 0x0B, 0x00, Type, 0x00, 0x00,K
Set Slide Cartridge Counter	0x1b, 0x04, 0x0B, 0x01, 0x00, Count, 0x00,K
Ribbon Calibration	0x1b, 0x04, 0x10, 0x01, 0x00, 0x00, 0x00,K